SOIL SURVEY OF THE MARIANNA AREA, FLORIDA.

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DESCRIPTION OF THE AREA.

Jackson County is situated in the northwestern part of Florida, along the Alabama line. On the east it is bounded by Gadsden County and the State of Georgia, on the south by Calhoun County, and on the west by Washington and Holmes counties. The included area is 963 square miles. The area surveyed has an extent of 357,120 acres, or 558 square miles, and comprises that portion of Jackson County lying west of the Chipola River, together with a small area

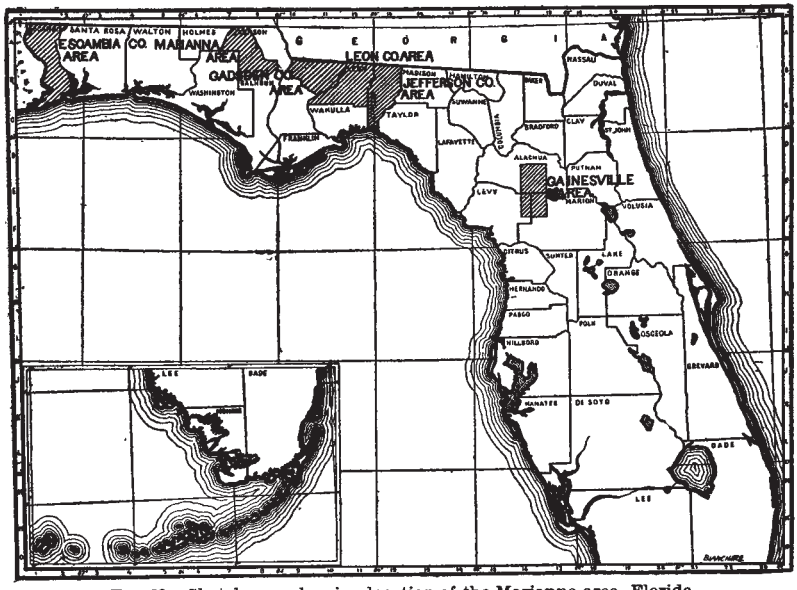

FIG. 22.—Sketch map showing location of the Marianna area, Florida.

lying east of the river and south of the Louisville and Nashville Railroad. The area has a length of 28 miles north and south, and at the southern boundary a width of 25 miles east and west.

The surface features of the area are for the most part rolling or hilly, but abrupt or roughly broken country nowhere exists. Narrow valleys among the hills and limited areas on the higher elevations, together with poorly drained bodies, swamps, and lowlands along

the streams form the level to gently undulating country. The southwestern part of the area is the more rolling, and it is believed that the highest elevations occur in this section. The only definite elevations obtainable are railroad levels. At Marianna the altitude is 89 feet; at Cottondale, 142 feet; at Cypress, 146 feet; and at Round Lake, in the southwestern part of the area, approximately 257½ feet above sea level and 75 feet higher than Compass Lake.

Differences in relief in this area are mainly the result of erosion. Among these agencies of erosion, solution is the most apparent and important. The circulation of the atmospheric waters below the surface has caused the formation of numerous caverns and channels in the limestone which underlies the region, and many sinks, ponds, "blue springs," natural bridges, etc., have thus been formed. The uneven dissolution of the underlying calcareous rocks has, therefore, determined to a large extent the general surface features of the area.

The Chipola River extends through the middle of the county from north to south and is the eastern boundary of most of the surveyed area. It is formed within the county by the union of Marshall and Cowarts creeks, and is fed by Blue Spring and Dry creeks, which drain respectively the east and west sections of the southern half of the county. The river is navigable for small craft, and large quantities of logs are annually rafted down it to Appalachicola.

Alligator and Spring creeks and their tributaries drain the most of the western part of the area. Several small streams which empty into Holmes Creek, the western boundary line between Jackson and Holmes counties, assist in the drainage to some extent. Carters Mill Creek is formed by a division in the Chipola River about 1.2 miles below Bellamys Bridge. Its course is nearly parallel to the river, and at an average distance of one-half mile west of it. When nearly opposite the Natural Bridge, about 6 miles north of Marianna, the creek sinks and eventually rises and continues as an open run until it reunites with the Chipola River.

Many of the streams of the area are fed by springs, the largest of which are found in the red hill lands northwest of Marianna and on to Campbellton. Blue Spring, about 6 miles east of Marianna and outside the surveyed area, is worthy of note as the source of Blue Spring Creek, a tributary of the Chipola River. Compass and Round lakes and Seventeen-Mile and Thirteen-Mile ponds are the only bodies of water of any size within the area, although small lakes and ponds abound. These lakes are fed by springs.

Three miles northeast of Kynesville there is an irregular V-shaped section of country covering an area of 3,000 acres, known as Rabs Valley. This valley extends in a general north and south direction for a distance of about 3 miles, and has an average width of one-fourth mile. It has evidently been formed both by mechanical and

chemical degradation of limestone, the disintegrated and dissolved rock being carried away in solution by an underground stream which flows southward through the depression. A valley similarly formed parallels the Louisville and Nashville Railroad from a point a short distance west of the Marianna depot to the Chipola River.

Jackson County was set off from Gadsden County in 1823 and the town of Marianna incorporated in 1829. The early settlers came principally from North Carolina, South Carolina, and Georgia, and were mostly of Scotch and English descent. They located on the "red lands," the first settlement being made about 8 miles northwest of Marianna in the early twenties. The federal census of 1900 gives the population of the county as 23,377. In 1905, according to the state census, the population of the county was 26,824, about equally divided between the white and the negro races.

Except in the northeastern and southeastern parts of the area surveyed the transportation facilities are good. The Louisville and Nashville Railroad crosses the county from east to west. This line connects with the Seaboard Air Line Railroad at River Junction, near the Apalachicola River, and runs to Jacksonville. Direct connection west is made with Pensacola, Mobile, and New Orleans. The Atlanta and St. Andrews Bay Railroad crosses the county from north to south in the western part. This road extends from Dothan, Ala., to St. Andrews Bay, Florida, and serves as an outlet for the southwestern and western portions of the area. It crosses the Louisville and Nashville Railroad at Cottondale. From Graceville, in the extreme northwest corner of the county, the Alabama and Florida Railroad, a branch of the Louisville and Nashville, extends in a northwesterly direction to Georgiana, Ala., a distance of 100 miles. A new line—the Marianna and Blountstown Railroad—in process of construction, will, when completed, extend from Marianna in a southeasterly direction about 30 miles to Blountstown, in Calhoun County.

The county roads as a rule are fairly good, but could be improved by side ditches and surfacing with crushed limestone and clay, which are conveniently at hand.

Marianna, the chief town in the county and the county seat, has a population between 1,800 and 2,000. It is located in the central part, on the Louisville and Nashville Railroad, 140 miles east of Pensacola. It is the chief distributing point for the produce of the area surveyed. Cottondale, Campbellton, Cypress, Graceville, Grand Ridge, Compass Lake, and Round Lake are important trade centers for their respective localities. Aycock is a flourishing sawmill town.

CLIMATE.

No complete records of the climate of Jackson County are available, the nearest Weather Bureau station at which normals of temperature

and precipitation have been established being Tallahassee. This station lies about 40 miles east of Marianna and thus has about the same altitude and the same position with relation to Gulf influences, and a table showing the salient characteristics of the climate is given. The data are doubtless fairly representative of conditions in the surveyed area. However, fragmentary records indicate that the local maximum summer temperatures are slightly higher than at Tallahassee. Local observations on frost occurrence for two years—1905 and 1907—indicate killing frosts in the early part of December and absence of such frosts after March 1. More extended records may probably show some, though not great, extension of these limiting dates.

The following table gives a resume of the details of record at Tallahassee:

Normal monthly, seasonal, and annual temperature and precipitation at Tallahassee.

Month.	Temperature.			Precipitation.			Greatest depth of snow in 24 hours.
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.	
	°F.	°F.	°F.	Inches.	Inches.	Inches.	Inches.
December	53	80	12	4.1	3.0	4.6	0.0
January	52	81	19	3.5	2.2	2.4	.0
February	55	80	− 2	4.8	2.4	6.7	2.0
Winter	53			12.4	7.6	13.7	
March	60	87	25	5.9	6.1	6.7	.0
April	67	90	38	2.7	2.2	4.0	.0
May	75	96	45	3.6	.9	2.1	.0
Spring	67			12.2	9.2	12.8	
June	79	97	54	6.8	10.5	16.5	.0
July	80	97	57	8.0	5.4	10.3	.0
August	80	96	61	7.1	7.3	3.9	.0
Summer	80			21.9	23.2	30.7	
September	77	95	52	5.1	1.0	4.8	.0
October	68	92	35	3.7	1.0	5.5	.0
November	59	83	27	2.9	2.9	1.5	.0
Fall	68			11.7	4.9	11.8	
Year	67	97	− 2	58.2	44.9	69.0	2.0

AGRICULTURE.

The "red lands," in the northern and northwestern parts of Jackson County and embraced within this survey, were the first to attract the attention of the early settlers, who came in the early twenties. They recognized that these soils were more productive than the light-

colored sandy soils occupying the greater part of the surrounding country, and that they could be put under cultivation easier and at less expense than the soils of the thickly wooded sections. In this old and well-established agricultural section practically the same crops and practices are followed to-day as in the begining. Those who settled later in the southern part of the area confined their efforts chiefly to stock raising. At a subsequent period they engaged in the lumber and turpentine industries. The latter was not extensively carried on until about 1890, and at about the same time the stock-raising industry greatly decreased on account of the burning over of the woodlands and the destruction of the pasturage.

The wide difference existing between the conditions of the farming classes of the two sections is due primarily to the soils, but is also the result of lack of transportation facilities in the southern part, which was for many years without a railroad. The small farms of this part of the area are owned and operated by the owners, who are usually whites, while in the northern section, where the largest holdings are found, the tenant system is followed, the renters with few exceptions being negroes. The owners of the plantations live in Marianna and other near-by towns and rent their land under various forms of leases. The most common method in use is to rent blocks of land varying in size from 25 to 35 acres, locally called a "one-mule farm," for which a rental of about 600 pounds of lint cotton is charged. Where the tenant has only an ox, the area allotted is less and a corresponding reduction in the rent is made. The landlords supply the tenant with provisions and other necessities for growing the crop, and at harvest time accounts are balanced. Occasionally land is rented for cash, the price ranging from $1 to $3 an acre.

Many once prosperous and productive plantations have shown a noticeable decline in crop yields due to the present methods of rental. The negro tenant for many generations has been trained to grow cotton and to look upon it as the only source of income. It is diffi cult, therefore, to induce him to attempt to grow any new crop, and of course, he is unfamiliar with the use of improved machinery The need of intensive cultivation and rotation of crops has manifested itself, but has been little heeded. Corn follows cotton, principally because the cotton has been fertilized the previous year. This is the only method of rotation, if such it may be called, and of course does not take into consideration the betterment of the soil. By using some winter-growing legume, such as bur clover or vetch. the producing capacity of the soil may be greatly increased. A mixture of rye or oats and hairy vetch, equal parts, sown broadcast in the cotton field in either September or October, will be found profitable. These being winter crops, they will furnish winter graz-

ing and may be cut for hay or turned under in the spring, thus adding humus, one of the constituents generally needed by soils given continuously to clean-culture crops like cotton and corn. Cowpeas make an excellent growth of vine on the Greenville and Orangeburg soils, while velvet beans may be successfully and profitably grown on the well-drained soils, including the deep sands. Cowpeas afford excellent pasturage for hogs and cattle, and the hay when properly cured furnishes a valuable roughage. The vines cut when about half the pods are ripe can be easily cured. Some beggarweed is grown, which makes a nutritious hay and also improves the land. Its acreage could be profitably increased. Sorghum, crimson clover, Bermuda grass, lespedeza, and alfalfa are other crops that can be successfully grown, and their production would prove both profitable and beneficial.

The Greenville sandy loam, reputed to be rich in lime, is believed to be exceptionally well suited to the growing of alfalfa. This is without doubt the most valuable of the hay crops, but requires peculiar soil conditions to make its production profitable. It is also a splendid soil renovator. Alfalfa requires a strong, well-drained soil, with the water table at least 2½ feet below the surface. Thorough preparation of the soil and careful management in the early stages are necessary for securing the best results. It does best on fields inoculated with soil from a field on which alfalfa has grown. A suitable application is about 400 pounds of soil and 200 pounds of bone meal. In sowing the practice should be to use the drill and seed at the rate of 25 pounds of seed to the acre. In some sections the seed is sown broadcast, but it is believed better results will be obtained under local conditions by drilling the seed in rows 20 inches apart. October or November is the time to sow. From well-established fields from 3 to 5 cuttings can be made each year.

Oats sown in October yield from 10 to 30 bushels an acre, but only a small acreage is grown. Peanuts are quite extensively grown, both for the market and for fattening hogs. The North Carolina variety of peanut is grown. The Spanish peanut is much earlier; planted in March, it is suitable for hog pasture by August 15. The acreage of peanuts could be very profitably increased, as the nuts and hogs are in good demand.

While the opportunities for developing dairying are good, it is carried on only in a limited way. A great variety of forage crops can be cheaply produced, and there is a splendid local market for all dairy products.

Commercial fertilizers were first used about 1880, and at the present time the majority of farmers use from 100 to 200 pounds to the acre for cotton.

It is estimated that the farms of the area range in size from 40 to 2,500 acres. The average size is probably 100 acres. A few negroes own farms ranging from 40 to 250 acres. Negro labor is employed almost universally and is for the most part unskilled. Ten dollars a month with board and 40 cents to $1 a day are the average wages paid. The saving effected by modern machinery has not been fully realized, but the scarcity of labor will make it necessary to introduce such implements if any decided development of the agriculture is to take place. Not only could much labor be saved by the use of disk plows, harrows, cultivators, and mowing machines, but the more thorough cultivation of the soils following their use would give increases in yields—more than repaying the added investment.

The farm lands vary somewhat in price, but the best grades can be bought for $10 to $15 an acre. The timbered sections are held at higher prices, varying with the quantity and quality of timber standing. The soils of the Marianna area are capable of producing much more than is being realized from them at the present time. A more diversified farming should be practiced for their permanent upbuilding and improvement. Cotton and corn, instead of being grown year after year on the same land, should be grown in a systematic rotation, including the legumes.

The chief markets for the produce of the area at present are the local towns, Marianna and Graceville, and Dothan, Ala.

The future development of the area agriculturally depends upon diversification, rotation of crops, the keeping of more live stock, and the use of various types of improved machinery.

SOILS.

All of the State of Florida is comprehended in the physiographic province known as the Coastal Plain. The geological formations of this division are all sedimentary, lie in nearly horizontal beds, and consist mainly of clays and sands. The sea occupying the present position of Florida was in early time remote from sources of sediment, and the proportion of wash from the higher land to the north and west was much less here than nearer the original shore line. The clear and open sea was favorable to the existence of certain forms of shell life, which flourished in vast numbers, their accumulated remains being later transformed into limestone. Florida is thus exceptional in being underlain at shallow depths by consolidated sedimentary deposits. The general geology of Florida is comparatively simple, as all the rocks are of sedimentary origin.

From a geological standpoint the Florida deposits are all of comparatively recent date. The oldest formation described is the Vicksburg limestone, believed to belong to the Oligocene division of the Cenozoic. This formation, which doubtless underlies the entire State,

has an estimated thickness of between 200 and 300 feet. This rock is, as a rule, soft and friable, although it may contain flint masses, which are very resistant to weathering. It contains an abundance of foraminifera and many other marine invertebrates and bivalves, mollusks and corals predominating. It is the most important water-bearing formation of central Florida. Much of the surface of the surveyed area is dotted with sink holes of all sizes. These sinks are formed where the readily soluble limestone lies at or near the surface and are not found where the earthy mantle has a considerable thickness. Underground streams and caves also evidence the proximity of the limestone. The sinks tend to fill by the caving in of the sides and the addition of material washed and blown from the surrounding land, and as a result a dark-colored heterogeneous soil is formed in these depressions. These sinks and solution basins give rise to the Swamp soil and the semiswampy Myatt fine sandy loam type.

The Vicksburg limestones frequently outcrop along the Apalachicola and Chipola rivers and Holmes Creek and influence the soils in varying degrees. The " red lime lands " of the Marianna area have been correlated with the Greenville series and are quite extensively developed. They characterize, in a general way, the country from north of Campbellton to near Marianna and are said to extend east and northeast from this point nearly to the Chattahoochee River. They also extend north of the area into Geneva County, Ala. These red soils are reputed to be rich in lime and are considered strong soils for general agriculture. The Greenville clay bears but little evidence of the original Lafayette covering. The subsoil is a product of the direct weathering of the close underlying Vicksburg limestone.

East and west of the Chipola River the country generally has a higher elevation, and here the Vicksburg is buried beneath later formations. The Lafayette formation is believed to have formerly covered all or practically all of Jackson County. The several soil types of the uplands having gray surface soils with yellow or reddish sandy clay subsoils trace their derivation to the Lafayette deposits. The superficial sands of the upland country, grading in color from gray to pale yellow, are believed by eminent authorities to be bleached-out Lafayette sands, although some observers regard them as material of the Columbia formation.

The soils having the yellow subsoils are placed in the Norfolk series, and those with red sandy clay subsoils belong to the Orangeburg group. Both series are widely distributed throughout the Coastal Plain.

The Chattahoochee limestone or other members of the Apalachicola group of formations occurs beneath the Lafayette on the road between Marianna and the Chipola River. The greatest development in Jackson County of the Chattahoochee series of dense limestones oc-

curs in the southeastern part. Wherever present it overlies the Vicksburg. The limestone exposed along the Chipola River, in the quarries and the country generally bordering the river, is the Vicksburg limestone.

All the soils of the area are derived from sedimentary material which when subjected to poor drainage or semiswampy conditions has produced the dark-colored soils. Swamp represents very poorly drained, unclassified alluvium, occupying wet stream bottoms, cypress ponds, sinks, and depressions.

The following table gives the name and extent of each type of soil mapped in the Marianna area:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Norfolk sand	81,856	22.9	Norfolk fine sand	10,816	3.0
Norfolk fine sandy loam	65,280	18.3	Orangeburg fine sand	1,728	.5
Swamp	54,208	15.4	Norfolk coarse sand	1,536	.4
Norfolk sandy loam	50,688	14.2	Grady fine sandy loam	1,536	.4
Orangeburg fine sandy loam	25,728	7.2	Greenville clay	768	.2
Orangeburg coarse sandy loam	16,768	4.7	Greenville loamy sand	768	.2
Greenville sandy loam	16,192	4.5	Rock outcrop	384	.1
Myatt fine sandy loam	15,232	4.2	Total	357,120	
Orangeburg coarse sand	13,632	3.8			

NORFOLK SAND.

The surface soil of the Norfolk sand is composed of 8 to 15 inches of light-gray or dark-gray incoherent sand of medium to coarse texture. Except in depressions where considerable organic matter has accumulated, the soil contains a very small quantity of humus. The areas in the northern part of the survey are, as a rule, finer and more loamy in texture than those of the southern section. The subsoil, which extends to a depth of several feet, is a loose, yellowish sand of medium to coarse texture. This is underlain by the characteristic yellow sandy clay of the Norfolk series, and when this is found at a depth of less than 3 feet the areas have been mapped, in accordance with the usual classification, as the Norfolk sandy loam.

The Norfolk sand is the most widely distributed soil in the Marianna area. The largest body of the type lies along the southern boundary from Round Lake, east and west, to the limits of the area. Numerous smaller areas are found in various parts of the survey. It occupies the highest hills, ridges, and gently undulating country, and the drainage is free and, in many cases, so thorough that the crops suffer from drought, particularly where the sandy subsoil is deepest, and where the organic matter has been depleted. The moisture con-

ditons are, however, better in the areas composed more largely of the finer grades of sand, and having a greater proportion of organic matter.

On the uplands the Norfolk sand has been derived through weathering from the Lafayette mantle, while some of the lowlands represent sands from the Columbia formation. The greater part of the type is at present covered with forests of black-jack oak and longleaf pine.

Inasmuch as the Norfolk sand does not retain moisture well, it is not adapted to general farming. This condition could be remedied to a marked degree by following a regular crop rotation, including velvet beans, cowpeas, or some other leguminous crop, and plowing the growth under. Wherever practicable the annual growth of grass and weeds should be plowed in and not burned, as is frequently done at present.

Cotton, corn, peanuts, and sweet potatoes are grown, but the yields are usually light, especially in seasons when the rainfall is below the average. Corn yields from 8 to 12 bushels and cotton from one-fifth to one-third bale per acre.

The Norfolk sand brings from $3 to $10 an acre, depending upon the location and the character of the timber growth.

The following table gives the average results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Norfolk sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20606, 20608.....	Soil.....	4.5	26.4	16.4	31.2	10.9	7.4	3.9
20607, 20609.....	Subsoil.....	3.1	23.7	15.9	34.5	11.4	6.3	5.2

NORFOLK FINE SAND.

The Norfolk fine sand consists of 12 inches of grayish-brown loamy fine sand, underlain by a yellow sand of about the same texture as the soil. When dry the soil is loose and friable, but it becomes somewhat firm and compact when wet. Normally of a rather loose porous structure and occupying gently rolling country, it is well drained and easily cultivated.

The Norfolk fine sand is not extensively developed in the Marianna area, though it occurs in all sections of the survey. The bodies are usually less than 1 square mile in extent and the total area is only 16.9 square miles. The largest area occurs near Jacob. The areas are most numerous in the southern half of the area. The native timber growth consists of longleaf and shortleaf pine with various kinds of oaks.

All the general farm crops of the county are produced on this type of soil, and the yields are better than on the Norfolk sand. The yields of cotton and corn are one-fifth to one-half bale and 8 to 12 bushels per acre, respectively. Oats yield from 12 to 20 bushels per acre, and potatoes give good returns.

While the Norfolk fine sand is more retentive of plant food and less susceptible to drought than the Norfolk sand, care must be taken to maintain the type in this advantageous condition. It is necessary to keep the soil well supplied with humus, which can best be accomplished by plowing under or pasturing some leguminous crop once every two or three years. Velvet beans have proven very satisfactory as a green manuring crop and should be used as one step of a regular crop rotation. Cowpeas and winter vetch may also be employed in the same way.

The Norfolk fine sand is one of the earliest truck soils in the region, and is particularly well adapted to the production of early Irish potatoes, snap beans, cucumbers, cantaloupes, melons, and strawberries. In growing these crops, however, it has been found necessary to use heavy applications of high-grade fertilizer. This not only insures larger crops, but improves the quality of the product. The value of this soil ranges from $3 to $12 an acre.

The results of mechanical analyses of the soil and subsoil are given in the following table:

Mechanical analyses of Norfolk fine sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20612	Soil	1.1	11.3	8.2	39.4	24.9	9.9	5.3
20613	Subsoil	1.5	10.3	8.0	39.8	24.3	8.6	7.5

NORFOLK COARSE SAND.

The surface soil of the Norfolk coarse sand consists of 6 to 10 inches of yellow or gray coarse to medium, loose sand. The subsoil is a yellowish-gray, coarse, incoherent sand, extending to a depth of 3 feet or more. Both soil and subsoil are composed of the same grades of sand, the line of demarcation being determined by the presence in the surface soil of a small quantity of organic matter, which imparts to it a darker color. Small amounts of fine gravel are present in both soil and subsoil.

The Norfolk coarse sand is of limited extent and at present is of no agricultural importance. The area southwest of Campbellton is the only body of this type occurring in the northern half of the survey. The remainder is found principally along the Atlanta and St. An-

drews Bay Railroad in the southern part. One area occurs east of the Chipola River, on the county boundary line.

The topographic features consist of small knolls and low ridges. These areas are closely associated with the Norfolk sand and represent the coarser material of the Lafayette formation. Drainage is so excessive, on account of the loose, porous character of the soil, that agriculture is not practiced. The natural forest growth consists of scrub oak and a scattering of stunted pine.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Norfolk coarse sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20600	Soil	9.9	52.6	11.6	14.9	4.5	4.0	1.9
20601	Subsoil	18.3	55.4	8.8	10.3	3.2	2.6	1.2

NORFOLK SANDY LOAM.

The soil of the Norfolk sandy loam consists of a coarse to medium sandy loam, gray in color and varying in depth from 12 to 36 inches. The average depth, however, is about 15 inches, and only in a relatively small percentage of the type does the sandy loam exceed a depth of 2 feet. The subsoil is a yellow sandy loam or sandy clay, in which the sand is slightly coarser than in the soil. In position and texture the Norfolk sandy loam does not differ materially from the Norfolk sand, except that the shallow areas are more loamy.

An important body of the Norfolk sandy loam occurs in the northwest corner of the area, at Graceville, and extends as an almost continuous strip in a southeasterly direction to Cottondale. Other areas of less extent are scattered throughout the southern part of the survey. The surface is level or gently rolling and well suited for cultivation. The drainage is good, and only where the sandy loam material is deepest are crops affected during seasons of scanty rainfall.

As in the case of the other Norfolk soils described, the Norfolk sandy loam has been derived through weathering from the Lafayette formation. The area at Cottondale is representative of the deep phase of this soil, and here the sandy clay as a rule does not approach nearer than 30 inches from the surface. Other smaller areas of this phase are found throughout the type. The characteristic timber growth consists of pine, oak, hickory, and sweet gum.

The Norfolk sandy loam, like the other agricultural soils of the area, is planted chiefly to cotton and corn. Cotton yields from one-fourth to one-half bale per acre, and corn from 8 to 20 bushels, de-

pending upon the care of cultivation. A limited acreage of oats is grown. This crop when fertilized gives good results, but as it is cut for hay and not thrashed, no definite yield can be given. From 200 to 300 pounds of fertilizer are applied to the acre for cotton, and about half that amount for corn. Sugar cane is grown for home use, the sirup obtained having a fine flavor and bright color.

Organic manures are of much benefit to this soil, as it is deficient in humus. It is susceptible of improvement by means of deeper plowing, crop rotation, and the growing of leguminous plants. Velvet beans, vetch, and rye should be grown for forage crops, as well as for enriching the land. Farms on this type of soil bring from $4 to $10 an acre.

NORFOLK FINE SANDY LOAM.

The Norfolk fine sandy loam consists of a gray or light-brown medium to fine loamy sand or fine sandy loam frequently carrying small iron concretions, underlain, to a depth of 36 inches, by a yellow sandy clay. The soil does not differ materially in color or texture from that of the Norfolk fine sand. Its depth is usually 8 to 15 inches, though in a few small areas it is as much as 24 inches. Underlying the yellow sandy clay at a depth of 3 feet or more is a mottled gray, red, and yellow clay. The typical yellow sandy clay includes fine and medium sands in such proportions as to make the whole a crumbly mass, closely resembling light brown sugar, both in color and texture. A few areas occur where the subsoil is a heavy yellow clay in the last few inches of the boring.

The soil is most extensively developed west and northwest of Aycock, from which it extends south into Washington County. Another area of considerable extent occurs at Marianna, the area reaching in a southeasterly direction for a distance of about 5 miles. The type occurs in areas of varying size elsewhere in the survey. Most of the areas occupy gently undulating to slightly rolling areas, and on account of their position and the light texture and open structure of the soil, the natural drainage is good. A few small depressed areas are found, and in these artificial drainage will prove beneficial.

In the western part of the area, where the Norfolk fine sandy loam is closely associated with the Myatt fine sandy loam, the surface soil is darker. This is due to the presence of a higher content of organic matter, the surface features being more conducive to the accumulation of plant remains. Fields become lighter in color with continued cultivation, unless the humus content is maintained. The type is derived through weathering from Lafayette deposits.

On account of its wide distribution, thorough drainage, and productiveness the Norfolk fine sandy loam is one of the best general farming soils of the area. It is adapted to the growing of corn, cot-

ton, peanuts, sweet potatoes, sugar cane, pecans, and tobacco. It is not as well suited to cotton as the Orangeburg soils, but for corn and sugar cane it is superior to the latter types. Corn yields from 15 to 30 bushels per acre, and cotton, with about 200 pounds of fertilizer, from one-third to one-half bale. The sirup produced from cane grown on this type of soil possesses a fine flavor and a beautiful bright color, which can not be obtained upon the soils with red subsoils. The yield ranges from 200 to 500 gallons per acre. Peavine hay, velvet beans, and sorghum are good forage crops for the soil and region. The first two mentioned, in addition to their feeding value, aid in maintaining the productiveness of the soil, and should be grown once every two or three years. Oats sown broadcast in October and cut for hay will be found to make a valuable feed. Pecans thrive, and it is generally conceded that they grow more rapidly upon this soil than upon the Orangeburg types.

The Norfolk fine sandy loam is the heaviest of the Norfolk series in the Marianna area. It is, however, easily cultivated, and owing to its sandy character and open structure permits of free movement of moisture. The fact that the sandy clay is very retentive of moisture affects the crop adaptation of the soil to a considerable degree. It is not so early as the Norfolk fine sand, though this difference is offset by larger acreage yields and the greater certainty of the crops, which is an important advantage in this part of the State. The type is especially well suited to the production of early spring vegetables, including cabbage, Irish potatoes, beets, cucumbers, asparagus, lettuce, and early strawberries. Areas of this type having a top soil 8 to 15 inches deep are ideal for growing Sumatra wrapper leaf tobacco under shade. In the counties of Gadsden, Leon, and Jefferson, in Florida, and Decatur, Thomas, and Grady, in Georgia, this is the leading tobacco soil. As the climatic conditions of Jackson County are similar and the soil the same as in the counties named, there seems to be no reason why the growing of wrapper leaf tobacco should not prove equally as profitable here. If properly cared for a perfect leaf of desirable color, satisfactory burn, and excellent quality may be produced. The average yield per acre is about 1,000 pounds, and the price ranges from 55 to 75 cents per pound in the bundle, according to the quality of the leaf.

Desirable areas of the Norfolk fine sandy loam, suitable either for general farm or for the special industries mentioned, may be purchased for $6 to $10 an acre, depending upon location, character of the timber growth, which consists of longleaf pine, oak, and hickory, and value of the improvements. Near Marianna such land sells for a higher price. Much of the type at present supports a forest covering.

The following table gives the results of mechanical analyses of the soil and subsoil of the Norfolk fine sandy loam:

Mechanical analyses of Norfolk fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20616	Soil	1.0	12.3	12.4	37.8	18.3	10.3	7.9
20617	Subsoil	.9	10.7	8.5	29.8	17.2	8.8	23.9

ORANGEBURG COARSE SAND.

The surface soil of the Orangeburg coarse sand consists of a coarse to medium gray or reddish-brown sand, usually incoherent, though in places containing sufficient organic matter to render it loamy in texture. The soil is from 8 to 15 inches deep and frequently contains a small percentage of coarse quartz grains and small iron concretions. The subsoil is a red, coarse to medium sand extending to a depth of more than 3 feet. In places where the surface soil is slightly more loamy than typical the subsoil usually contains enough silt or clay to cause it to cohere when moist.

The largest bodies of the Orangeburg coarse sand occur in the southern and southeastern parts of the area and tracts of less extent are found in the southwestern part. The surface is gently undulating to level, but the areas never occupy wet positions, and, on account of the open, porous nature of the material and the depth to the clay, crops frequently suffer from drought.

The Orangeburg coarse sand is derived from deposits of Lafayette age, which, in some cases, have been modified by erosion, as, for instance, in the large area on the east side of the Chipola River, about 5 miles southeast of Marianna, which represents a typical river terrace. The original timber growth comprises oak, hickory, dogwood, sweet gum, and some pine.

Corn, the principal crop, yields from 8 to 15 bushels per acre. Cotton is grown to a limited extent, the yield per acre seldom being above one-third bale. Peanuts, velvet beans, and other leguminous crops grow well on this type of soil. In some sections of the tobacco-producing belt of Florida wrapper and filler tobacco are successfully grown on soils of similar character. Although its adaptability to tobacco in this area has not as yet been demonstrated, it is thought that the porous nature of both soil and subsoil would render it too susceptible to drought to be safely used for this crop. The truck crops and all kinds of vegetables and small fruits produce good yields and should be more extensively grown. Much can be done to improve the Orangeburg coarse sand by rotation and fertilization. One aim of all cultural methods should be the addition of organic matter.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Orangeburg coarse sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20626	Soil	5.5	40.5	13.6	18.2	7.1	7.8	8.4
20627	Subsoil	4.4	30.5	13.4	21.8	9.5	8.1	12.4

ORANGEBURG FINE SAND.

The surface soil of the Orangeburg fine sand consists of 10 to 15 inches of brownish-gray fine loamy sand or light-textured fine sandy loam. There is usually present a small amount of medium angular quartz grains, but no stones or gravel. The subsoil, which is a red sticky fine sand, extends to a depth of more than 3 feet. The fine sand particles are held together by silt and clay particles, the proportion present being almost sufficient to form a light-textured fine sandy loam.

This soil is closely associated with Orangeburg coarse sand, and in origin they are identical. The Orangeburg fine sand, owing to its texture and structure, is a more productive soil and more retentive of plant food and moisture than the Orangeburg coarse sand.

The total area of the Orangeburg fine sand is small, being less than 2 square miles. It is represented by a few small bodies in the northern part of the area and one in the southern half. The surface varies from nearly level to gently undulating, and the natural drainage, both surface and subsurface, is good. The native timber growth consists of hardwood and pine, the former predominating.

Only the staple crops of the area are grown on this soil, the yields of which are heavier than those produced on the Orangeburg coarse sand. The crops are also more certain, being less influenced by deficiency in rainfall. The average yield of cotton ranges from one-third bale to one-half bale, and of corn from 10 to 20 bushels per acre. Oats have been found to do exceptionally well on this type, and it is well suited to such vegetables as tomatoes, beans, sweet potatoes, and melons. As upon the Orangeburg coarse sand, the content of organic matter may be cheaply increased and the power to hold moisture augmented by the growing and turning under of the leguminous crops.

The following table gives the results of mechanical analyses of the soil and subsoil of the Orangeburg fine sand:

Mechanical analyses of Orangeburg fine sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20628	Soil	1.9	15.1	8.4	36.6	22.8	7.9	7.4
20629	Subsoil	.6	10.4	8.5	35.7	22.9	6.7	15.3

ORANGEBURG COARSE SANDY LOAM.

The Orangeburg coarse sandy loam consists of 8 to 15 inches of medium to coarse gray or reddish-brown sandy loam, underlain by a red coarse sandy clay containing in many places small quartz gravel and iron concretions.

Only a limited area of this soil is found in the Marianna area. The largest bodies occur in the extreme northern part, and small areas in the southeastern part. West of the Chipola River, south of Thirteen Mile Pond, or west of Aycock, no areas are found. The topography is gently rolling and the natural drainage good. The type is derived from sands and clays of the Lafayette.

The Orangeburg coarse sandy loam is usually found bordering areas of Norfolk sand. It is also closely associated with the Norfolk sandy loam, and has about the same agricultural value. In its natural state it supports a forest of oak, hickory, and pine. It is a good soil for general farming purposes, is easily cultivated, and responds readily to fertilizers. The crop yields are a trifle below those secured on the Orangeburg fine sandy loam. Cotton and corn are the principal crops grown at present. The yield per acre of cotton ranges from about one-fourth to one-half bale, and of corn from 10 to 20 bushels. Land of this character sells for less than $10 an acre.

The results of mechanical analyses of soil and subsoil of this type are given in the following table:

Mechanical analyses of Orangeburg coarse sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20632	Soil	2.3	27.8	16.1	24.3	9.1	8.9	11.7
20633	Subsoil	3 5	24.6	14.2	20.1	6.7	8.3	22.6

ORANGEBURG FINE SANDY LOAM.

The surface soil of the Orangeburg fine sandy loam is a gray, brown, or reddish-brown fine sandy loam varying in depth from 6

to 15 inches, with an average depth of 12 inches. The subsoil is a red sandy clay, in which the finer grades of sand predominate. Iron concretions are usually present in both soil and subsoil, and occasionally considerable quantities are found upon the surface.

The Orangeburg fine sandy loam is developed mainly in the northeastern part of the area, north of the Louisville and Nashville Railroad and east of the Atlanta and St. Andrews Bay Railroad. A few small areas occur scattered through the central part of the survey. The topography is rolling, which, in connection with the open character of both soil and subsoil, gives the areas good natural drainage. Upon the steeper slopes there has been some erosion, as indicated by more shallow surface soil and the exposure of the subsoil in a few places. However, the slopes are not steep enough to cause gullying, and contour cultivation and sidehill ditches are unnecessary. The Orangeburg fine sandy loam, like the other members of the Orangeburg series, is the weathered product of materials of the Lafayette formation. The native vegetation is oak, hickory, and pine.

This type is well adapted to the general farm crops and is considered an especially strong cotton soil. It ranks next to the Greenville sandy loam in productiveness and agricultural value, and gives good yields of the staple crops of the area. Corn returns an average yield of 10 to 20 bushels and cotton from one-third to one-half bale per acre. These yields are secured with applications of 100 to 200 pounds of fertilizer to the acre; with heavier applications and more careful culture a few progressive farmers increase their yields 100 per cent. The oat crop, which is grown for hay, does well.

The Orangeburg fine sandy loam is especially well adapted to the production of Cuban filler tobacco, the yield ranging from 600 to 800 pounds per acre. A dark, heavy leaf of excellent texture, good burn, and fine aroma is secured.

Velvet beans, crimson clover, vetch, and other legumes do well, and should be more extensively grown for forage, seed, and enriching the soil. Sugar cane makes a good growth upon this soil, yielding a large quantity of sirup, though it is darker and inferior in quality to that produced upon the Norfolk soils.

At present the methods of cultivation practiced upon this soil are inadequate to secure the best results. More thorough preparation of the land, more careful and systematic cultivation, and the rotation of crops, including legumes, will materially improve the productiveness of the farms. Deeper plowing is an important step in this better system of cultivation, and methods looking to a careful conservation of soil moisture will be found to pay well. At present crop rotation is not practiced and little commercial fertilizer is used on this soil, and while it is naturally productive, in many instances continuous cropping to the clean-culture crops has greatly reduced the output

of once fertile farms. Land of the Orangeburg fine sandy loam can be bought for $5 to $12 an acre.

The following table gives the results of mechanical analyses of soil and subsoil of this type:

Mechanical analyses of Orangeburg fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20634	Soil	1.2	10.4	8.3	35.7	25.7	10.0	8.8
20635	Subsoil	1.2	7.8	5.7	25.1	18.7	8.7	32.8

GREENVILLE LOAMY SAND.

The Greenville loamy sand consists of a dark-red or reddish-brown, medium, loamy sand or light-textured sandy loam, about 12 inches deep, resting on a subsoil of slightly sticky sand resembling the soil in texture, but having a lighter red color.

In extent the Greenville loamy sand is quite limited, though it is typically developed in the small areas it occupies. It occurs mainly in the northwestern part of the area, where it is found in gently undulating bodies closely associated with the Greenville sandy loam. The smaller bodies of the type are usually found within the fine sandy loam type. Other isolated areas occur as low ridges or knolls, about 5 miles south of Marianna.

The type, owing to its open texture and sloping topography, is well drained. It is derived from the Lafayette formation, and differs from the Orangeburg coarse sand principally in the color of the surface soil. The subsoil is capable of retaining a relatively larger quantity of moisture than the other sand types of the area, thus making the Greenville loamy sand a desirable soil, both for general farm and special crops. The yields of cotton range from one-third to one-half bale, and of corn from 10 to 20 bushels per acre. The type is admirably adapted to small fruits and vegetables. Cabbage, lettuce, tomatoes, melons, cucumbers, and potatoes do exceptionally well, but so far these have been grown only for home use.

The following table gives the results of mechanical analyses of soil and subsoil of this type:

Mechanical analyses of Greenville loamy sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20590	Soil	1.7	13.2	9.4	31.2	19.5	11.0	14.0
20591	Subsoil	1.2	11.6	10.2	31.1	19.4	8.8	17.8

GREENVILLE SANDY LOAM.

The surface soil of the Greenville sandy loam, to a depth of 6 to 12 inches, is a red or reddish-brown somewhat heavy sandy loam of medium texture. The subsoil is a red sandy clay extending to a depth of several feet, where it rests upon limestone. There is some variation in both soil and subsoil, the proportion of sand being greater in some areas than in others. When wet the typical soil is heavy and very sticky, and it hardens and forms a crust on drying, acting more like a loam, thus making it more difficult to cultivate than the deeper and lighter sandy soils of the area. When thoroughly dry, however, the soil has noticeably a granular structure.

This soil is of sedimentary origin, being the weathered product of a relatively thin covering of the Lafayette formation over the Vicksburg limestone. It is probable that in some areas the deeper subsoil may have been influenced to a slight extent by the underlying rock, but there can be no doubt as to the classification of the soil with the sedimentary soils.

The Greenville sandy loam is confined to the northwestern part of the area and occupies fairly level to gently rolling country. The same soil type was recognized in the soil survey of Butler County and also of Henry County, Ala., and it is believed to exist in other limited areas elsewhere in the southern part of the same State. It is a well-drained soil and is considered the strongest and best of the area for the general farm crops. Most of the type has been cleared of the original forest growth, consisting of oak, hickory, and dogwood, and is now under cultivation. Very little pine is found on this soil.

The Greenville sandy loam is considered more productive than the gray-surfaced Orangeburg fine sandy loam, the yields for cotton and corn under the same treatment being appreciably higher. It is well adapted to the production of hay and oats, although cotton and corn are the chief crops. The yields of cotton range from one-fourth to two-thirds bale, of corn from 12 to 30 bushels, and of oats from 15 to 30 bushels per acre. Cane produces well, the average yield being about 500 gallons of sirup per acre. About 200 bushels is the average yield per acre for sweet potatoes.

The Greenville sandy loam should prove especially well suited to the growing of alfalfa, and there is an excellent opportunity to devolop a paying industry in the production of this crop. Alfalfa is, without doubt, the most valuable of the hay crops, besides being a splendid soil renovator. Wheat has been successfully grown and at the present time it would probably prove a remunerative crop.

Indifferent methods of cultivation are responsible for the comparative low yields secured at present upon this type of soil. Where sys-

tematically managed the type can easily be made to yield much larger returns. With deeper plowing, from 8 to 10 inches, and shallow cultivation, together with a proper crop rotation, at least one bale of cotton per acre should be produced, and the yield of other crops should also be proportionately increased.

No system of rotation is practiced, except that corn usually follows cotton in order to benefit by the residual effect of fertilizers used the previous year. A rotation that is suited to this soil consists of cotton two years, corn and cowpeas one year, followed by oats, rye, or vetch sown in the fall, and then by cotton. Most of the Greenville sandy loam is still held in large bodies, the price ranging from $10 to $25 an acre.

The average results of mechanical analyses of the soil and subsoil of this type are shown in the following table:

Mechanical analyses of Greenville sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20594, 20596, 20598..	Soil.....	2.8	15.1	11.6	31.4	12.8	11.7	14.9
20595, 20597, 20599..	Subsoil ...	1.7	11.9	8.9	24.9	10.6	10.5	31.7

GREENVILLE CLAY.

The Greenville clay consists of less than 4 inches of red or brown heavy clay loam or sandy clay overlying a red or yellowish-red stiff clay. Frequently the surface soil is lacking, and the stiff clay forms the soil, extending to varying depths with little change in texture and resting upon the calcareous rock from which it is in part if not wholly derived.

The type is thus believed to be mainly residual in origin, being largely the weathered product of the underlying impure Vicksburg limestone. The surface soil may be in part influenced by the Lafayette formation, from which the other members of this series are derived. But for the limited area of the clay type it would in all likelihood have been given a local name, as it is not strictly comprehended by the Greenville characteristics. As shown in cuts, the line of contact between the rock and clay is very sharp. While red is the predominating color of the stiff clay subsoil, yellow, brown, drab, and black are not uncommon. That the type is closely related to the Vicksburg limestone of the area is evidenced by the fact that it occurs only in the vicinity of this rock. It occupies small knolls and narrow ridges in the country northwest of Marianna. Frequently the underlying limestone outcrops on the surface, a condition which is represented on the accompanying map by means of an appropriate symbol.

Its position, small acreage, and stiff, tenacious character render the Greenville clay practically nonagricultural. It supports some grass and a forest growth of cedar, pine, and oak.

The results of mechanical analyses of a sample of the soil and subsoil of the Greenville clay are given in the following table:

Mechanical analyses of Greenville clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20592	Soil	0.9	3.2	2.0	13.6	11.0	10.3	59.0
20593	Subsoil	.3	.9	.6	4.5	3.4	18.2	72.0

MYATT FINE SANDY LOAM.

The soil of the Myatt fine sandy loam consists of a very dark gray to black material, composed mainly of the finer grades of sand, silt, and clay, mingled with a relatively large quantity of organic matter. From 8 to 12 inches of this mucky material constitutes the soil. Below this is found a subsoil of tenacious gray or drab clay streaked and mottled with yellow.

Areas of the Myatt fine sandy loam are confined chiefly to the western part of the survey, north of the Washington County line. The type is developed less extensively in the southern part, and does not appear at all in the northeastern part. It occurs as narrow strips along streams, as local depressions, and as narrow areas surrounding lakes and ponds. The surface is generally flat and the drainage inadequate. Many swamp areas and small cypress ponds are scattered throughout the areas, and for the most part the type is crawfishy and wet during the greater part of the year.

Little or none of the Myatt fine sandy loam has been cultivated. Small spots included in fields of other soil types indicate the productiveness of the soil. Upon some of the better-drained areas corn would undoubtedly prove a profitable crop, but over the most of the type drainage must be established before it can be profitably cultivated. When properly drained the Myatt fine sandy loam should prove well suited to the production of celery, onions, cabbage, lettuce, and late truck crops in general. It should also produce large yields of Irish potatoes. At present the Myatt fine sandy loam supports a luxuriant growth of wire grass, which affords excellent pasturage during spring and early summer, and grazing is one of the chief uses of the areas. The natural growth consists mainly of water-loving vegetation and a few scattering longleaf pines. Cypress occupies the more depressed and swampy localities.

The results of mechanical analyses of the soil and subsoil of this type are given in the following table:

Mechanical analyses of Myatt fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20638	Soil	0.6	10.0	5.8	16.9	10.5	37.6	18.6
20639	Subsoil	.9	7.8	6.1	13.4	6.4	34.3	31.1

GRADY FINE SANDY LOAM.

The Grady fine sandy loam consists of 10 to 15 inches of dark-colored fine sandy loam, resting on a drab or yellow and gray mottled tenacious clay. There is a considerable percentage of fine sand in the subsoil material, but this does not seem sufficient to make it friable.

Only a limited area of this type is found in the survey. It occurs as small bodies along the Chipola River, and occupies a position slightly elevated above Swamp. While most of the type is subject to occasional overflow, it does not remain in a swampy condition. Numerous sinks and underground channels are characteristic features of the area near Natural Bridge, and here the subsoil is heavier than in the other areas of the type, owing probably to the close proximity of the underlying limestone. This particular area was at one time cultivated, but the greater part of the type is occupied by a heavy growth of oak, beech, gum, magnolia, and pine.

In origin this type is in part residual and in part sedimentary. The surface soil is composed of materials of the Columbia formation, in which have been incorporated a large proportion of organic matter; the subsoil is derived from the limestone which underlies the type at varying depths.

Locally known as "hammock land," the Grady fine sandy loam is recognized as a productive soil. In favorable seasons it gives good yields of corn and cotton and it is especially well adapted to the growing of sugar cane.

The results of mechanical analyses of a sample of the soil and subsoil of the Grady fine sandy loam are given in the following table:

Mechanical analyses of Grady fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20622	Soil	1.2	7.7	6.8	50.6	23.9	6.8	3.1
20623	Subsoil	.5	5.0	4.6	38.5	20.2	5.2	25.8

ROCK OUTCROP.

Extending in a northwesterly direction from near Marianna to Campbellton is a stretch of country through which are scattered many small areas of outcropping limestone. The areas occur as isolated knolls and as long narrow ridges and range in size from one-fourth acre to about 200 acres. In the crevices and depressions in the rocks where a thin layer of soil has accumulated cedar, oak, pine, and hackberry grow. The rock has some value as building material and as a source of lime. In some cases it also contains as much as 16 per cent of phosphoric acid. There are approximately 384 acres of Rock outcrop in the area.

SWAMP.

The Swamp of the Marianna area includes those bodies of low-lying land that are covered with water the greater part of the year. It occurs in two phases. One is found along nearly all the water courses, and its extent in such positions is usually directly proportional to the size of the stream. Such areas are subject to overflow and are never cultivated. They support a dense and valuable growth of cypress and black gum on the submerged portions and magnolia, water oak, and black pine, with a dense undergrowth of briers and vines, on the slightly elevated areas. The other phase of Swamp is associated with the various soil types as isolated bodies, varying from the small cypress ponds of less than 1 acre in extent to the large "bays" and "galls" embracing many acres. The sinks and depressions, which are formed by the dissolution of the underlying limestone, are almost innumerable. When drainage of these areas becomes obstructed swampy conditions result. Many such areas are too small to be shown in the accompanying map.

Several extensive areas of Swamp occur in different parts of the survey, the largest being found in the southern and western parts.

The soil material of the Swamp is variable, though for the most part the surface consists of a mixture of decomposed vegetable matter and sand, resting at varying depths upon a stiff drab or blue clay, frequently containing thin strata of sandy material.

Some attempts have been made to drain a few Swamp areas, notably at Cottondale and Campbellton, and, if successfully accomplished, the soil, which is rich in organic matter, will no doubt prove admirably suited to the production of corn, celery, and late truck. On account of their position, however, it will be impracticable to drain the greater part of the isolated Swamp areas, and their value must be mainly for the timber which they support.

SUMMARY.

Jackson County is located in the northwestern part of Florida. The area surveyed covers the western half of the county and com-

prises about 558 square miles. The surface features are gently undulating to hilly, but no precipitous slopes exist.

Jackson County was organized in 1822, and embraces 963 square miles. Marianna, the county seat, was incorporated in 1829. It has an estimated population of 1,800 or 2,000. The first settlers came from the Carolinas and Georgia, and were mostly of Scotch and of English descent. In 1905—according to the state census—the population of the county numbered 26,824.

The size of the farms varies from 40 to 2,500 acres. Farming is carried on mainly under the tenant system. The greater part of the agricultural land is well drained and under cultivation.

Cotton and corn are the principal crops grown, with oats, sweet potatoes, sugar cane, and vegetables as minor products.

Except near the towns, where prices are somewhat higher, the value of the farming lands ranges from $3 to $25 an acre, and there is yet plenty of good land on the market at reasonably low prices.

Sixteen types of soil, including the nonagricultural types, Swamp and Rock outcrop, were recognized. These soils are similar to those found throughout the Coastal Plain, and belong to established soil series of this physiographic province. Two new members, a loamy sand and a clay, were added to the recently established Greenville series, and one new member, a coarse sand, to the Orangeburg series.

The soils are derived mainly from the Lafayette and Columbia formations, but are influenced in some cases by the underlying calcareous rocks.

The soils consist chiefly of sands and sandy loams, and are grouped in the following series: The Orangeburg series, four members (coarse sand, fine sand, coarse sandy loam, and fine sandy loam); the Norfolk series, five members (fine sandy loam, sandy loam, sand, fine sand, and coarse sand); the Greenville series, three members (sandy loam, loamy sand, and clay); and the Myatt series, one member (fine sandy loam). The Grady fine sandy loam is classed as a miscellaneous type.

The sandy loams are all well adapted to the general farm crops. The Greenville sandy loam is the heaviest, strongest, and most productive soil of the area. It is the most desirable soil for the growing of alfalfa, and wheat thrives well upon it. The sands are best suited to the light truck crops, and when within reach of markets they should be devoted to the production of such crops. The Greenville loamy sand is the most productive of the sandy types. The Norfolk sand is the most extensively developed soil type of the area.

Swamp affords a valuable timber growth of cypress, gum, bay, pine, and water oak. Rock outcrop areas are nonagricultural. The rock is used for building purposes and is valuable in some cases as a source of phosphoric acid.

Under the present methods of rental and cultivation the best lands of the area are yielding much smaller returns than they are capable of yielding. More attention should be given to their permanent upbuilding so as to increase the acreage yields. To accomplish this, the growing of leguminous crops, the rotation of crops, greater diversification of crops, deeper plowing, more thorough preparation and cultivation, and the use of improved farm machinery are recommended.

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U.S. DEPT. OF AGRICULTURE
BUREAU OF SOILS
MILTON WHITNEY, CHIEF

SOIL MAP

FLORIDA
MARIANNA SHEET

R. 13 W. | R. 12 W. | R. 11 W. | R. 10 W. | R. 9 W. | R. 8 W.

T. 7 N. | T. 6 N. | T. 5 N. | T. 4 N. | T. 3 N. | T. 2 N.

LEGEND

- Norfolk coarse sand — Nc
- Norfolk sand — Ns
- Norfolk fine sand — Nf
- Norfolk sandy loam — Nl
- Norfolk fine sandy loam — N
- Orangeburg coarse sand — Os
- Orangeburg fine sand — Of
- Orangeburg coarse sandy loam — Oc
- Orangeburg fine sandy loam — Ol
- Greenville loamy sand — Gf
- Greenville sandy loam — G
- Greenville clay — Gc
- Myatt fine sandy loam — M
- Grady fine sandy loam — Gs
- Swamp — S
- Rock outcrop — R

SOIL PROFILE
(3 feet deep)

- Norfolk coarse sand — Cs
- Orangeburg coarse sandy loam — Csc
- Norfolk sand — S
- Orangeburg fine sandy loam — Fsc
- Norfolk fine sand — Fs
- Greenville loamy sand — Gl
- Norfolk sandy loam — Sl
- Greenville sandy loam — Sc
- Norfolk fine sandy loam — Fs
- Greenville clay — Hcl
- Orangeburg coarse sand — S
- Myatt fine sandy loam — Fsl
- Orangeburg fine sand — Fs
- Grady fine sandy loam — Fsc

LEGEND

Fs	Fine sand
Sc	Sandy clay
Sl	Sandy loam
S	Sand
Cs	Coarse sand
Fsl	Fine sandy loam
Cl	Clay loam
Csc	Coarse sandy clay
Hcl	Heavy clay loam
C	Clay
Fsc	Fine sandy clay

Soils surveyed by
Grove B. Jones, R.W. Rowe, J.C. Britton,
R.B. Hardison and C.R. Zappone Jr.
1909

Scale 1 inch = 1 mile

Field Operations
Bureau of Soils
1909